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# Pesticide Safety 2006 - Best Management Practices 2006

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## BEST MANAGEMENT PRACTICES

### Phosphorus Management in Cranberry Systems


Research in WI has shown that additions of phosphorus fertility. However, trying to add phosphorus to a cranberry system is difficult - one of the few aspects of cranberry production that makes the situation complex. What makes the situation complex is that programs of phosphorus application are based on conflicting information. Test values of phosphorus in soil (20-80 ppm) are either at the level of or below this value.

Phosphorus is a mobile nutrient in plants. In cranberries, phosphorus is mobile in the plant. In soil, phosphorus is immobile. Soil moisture conditions affect phosphorus availability in soil. Also,

berries require phosphorus.

ranges normal during the summer growing season. Since soils have definitely reached this point by the time recommended for tissue sampling (August 15 - September 15), it is a good idea to take your soil and plant samples together. This supersedes previous recommendations in the Cranberry Chart Book.

phosphorus fertilizer rate. On



## BEST MANAGEMENT PRACTICES

### Nitrogen Management in Cranberry Systems

The single most important nutrient element in cranberry production is nitrogen. Nitrogen is required by cranberry plants for the production of vegetation (new leaves and stems), roots, and fruit (crop). Cranberry plants get nitrogen from the soil, from water (very little), or from added fertilizers.

Approximately 95% of the nitrogen in a given soil that becomes 'plant-available' in a single growing season comes from the decomposition of soil organic matter. Cranberries are grown in either organic or mineral soils. Organic soils are composed of sand or in mineral soils. Average organic matter in the surface horizon of organic soils is about 3-5%.

Mineralization, depends on soil status. The release process, when the soil is waterlogged, the bacteria cannot get enough air to function well. As with many biological reactions, mineralization is also affected by temperature, tending to increase with temperature.

#### Recommended Practices

- ♦ **Soil testing.** Periodically test soil for organic matter content and soil pH.

Soil should be tested for organic matter content as this material releases nitrogen for use by the cranberry plants. Test soil for organic matter every 2-3 years, always testing the year after sanding. Sandy bogs have less potential for natural N release. As organic matter in the soil increases, less fertilizer N should be used.

Soil pH should be tested at least once every three years (more often if you are attempting to modify pH). As soil pH rises, biological conversion of cranberry-preferred ammonium to less-desirable nitrate increases. This phenomenon is most pronounced in organic soils.

Carolyn DeMoranville

# BMPs are now on the Station web page

- Start at the home page  
[www.umass.edu/cranberry](http://www.umass.edu/cranberry)
- Click on “Grower Services”
- Select Best management practices
- Click on a practice to get a searchable html version
- Click on “pdf” to get a printable version



# Water management

## Irrigation BMP:

- Irrigate judiciously
- Monitor moisture
- Conserve water while supporting production





# Problem with over-irrigating

- Irrigation research  
Lampinen and  
DeMoranville
- When beds are too  
wet yield is less
- Part of the reason is  
poor fruit set and  
retention



Yield (bbl/a) in irrigation treatments.  
Differences in 2000 and 2001 were statistically different.

| Irrig.<br>Treat. | 1999 | 2000 | 2001 | Cumulative<br>3 years |
|------------------|------|------|------|-----------------------|
| ideal            | 207  | 80   | 193  | 472                   |
| wetter           | 187  | 50   | 120  | 357                   |
|                  |      | *    | *    |                       |

Data bears out the observation that most beds are too wet  
1999 was the driest year of the three

Distribution of uprights into classes.

Zero refers to uprights that flowered but did not support any fruit. Numbers one through three refer to uprights that supported that number of fruit.

\*indicates significant difference within row. 1999 and 2000 data were similar.

| Upright type  | <u>2001</u> |            |
|---------------|-------------|------------|
|               | Ideal (%)   | Wetter (%) |
| Non-flowering | 61.9        | 63.1       |
| Zero          | 18.1*       | 23.5*      |
| One           | 17.6*       | 11.2*      |
| Two           | 2.2*        | 1.4*       |
| Three or more | 0           | 0          |

Failure to retain even one fruit accounted for decreased yield in standard (wetter) irrigation plots

# Water Management Late Water



Fresh Fruit, Disease Management, Flood  
Management, Insect Management  
BMPs:

- Late water promotes quality and may  
reduce need for pesticide inputs



# Late Water Effects

- Benefits of Late Water
  - Suppresses fruit rot for at least 2 years
  - Suppresses SRM for up to 2 years
  - Suppresses CFW and cutworms
  - Depresses dewberry populations
  - Growth stimulation (need less N)

# Cultural modifications with LW

(LW in 1993)

|                | 91-92 | 93 (LW) | 94  |
|----------------|-------|---------|-----|
| # Fungicides   | 3.3   | 1.9     | 3.5 |
| # Insecticides | 4.2   | 1.7     | 3.4 |

Reduced sprays without loss of quality

# Effect of LW on fruit rot incidence (process fruit bed)

- Year of LW - below threshold of 3% at harvest with no fungicides used (little or no storage rot)
- Year after LW - again no fungicide needed
- 2 years after LW - mid-rate fungicide again required

# Fungicides after late water

- If the KQF is good, no fungicide in year of LW (one for fresh fruit)
- Similarly, 1 application can suffice in the year after late water (2 for fresh fruit)
- In both years minimum registered rates are recommended

Late water reduced cranberry fruitworm,  
allowing good control with fewer  
insecticide applications.

|                                  | No late water | Late water |
|----------------------------------|---------------|------------|
| Berries w/CFW eggs (%)           | 4.92          | 0.52       |
| Insecticide applications for CFW | 2.70          | 0.88       |
| CFW damage at harvest (%)        | 0.48          | 0.49       |

# Cranberry Fruitworm - Late water duration experiment

## Hibernacula (overwintering stage)

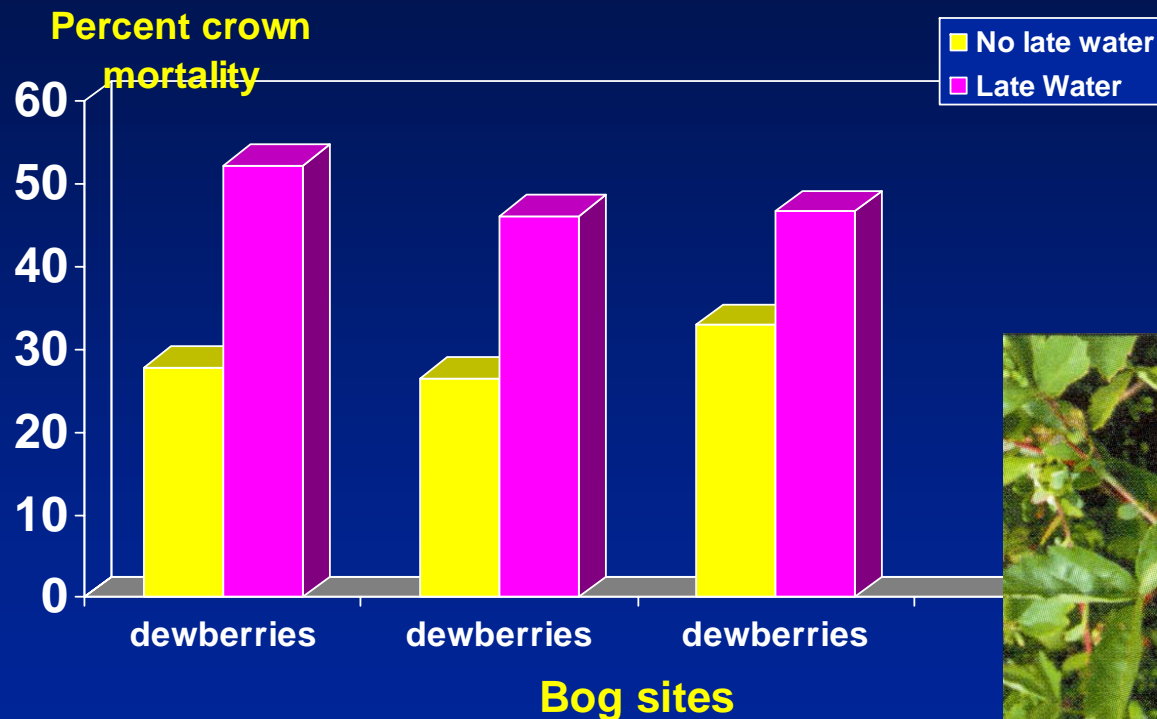




Four-week vs. 2.5- to 3-week late water flood.  
Is a shorter flood (removed early) sufficient to  
control cranberry fruitworm?

| Site | Flood length                | CFW mortality     |
|------|-----------------------------|-------------------|
| 1    | 2.5 weeks                   | 50%               |
| 2    | 2.5 weeks                   | 45%               |
| 3    | 2.5 weeks<br><b>4 weeks</b> | 40%<br><b>98%</b> |
| 4    | 3 weeks<br><b>4 weeks</b>   | 41%<br><b>94%</b> |

# Late water also suppresses dewberry (an invasive weed)



Offshooting was also suppressed

# Late Water - is this a good year?

- Inspect for winter injury - off colors, leaf drop?
- Big crop in 2005?
- Good sunlight in 2005
- Good dormancy conditions this winter but mild – recommend starting early

# Late Water considerations

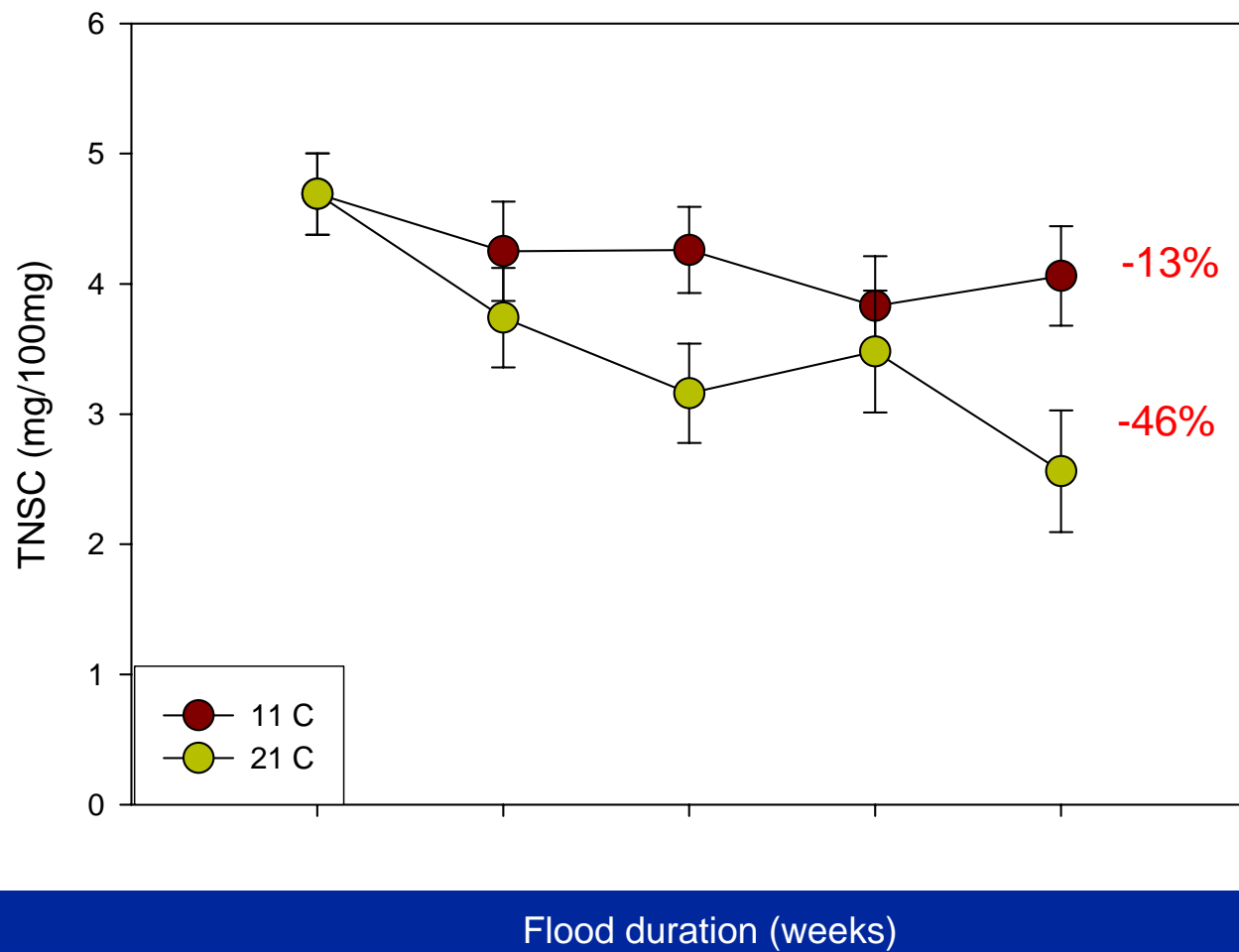
- Apply while buds are tight and red
- May need to start early this year due to mild winter
- Water temperature is critical



# Lab study – Water Temperature – Justine Vanden Heuvel

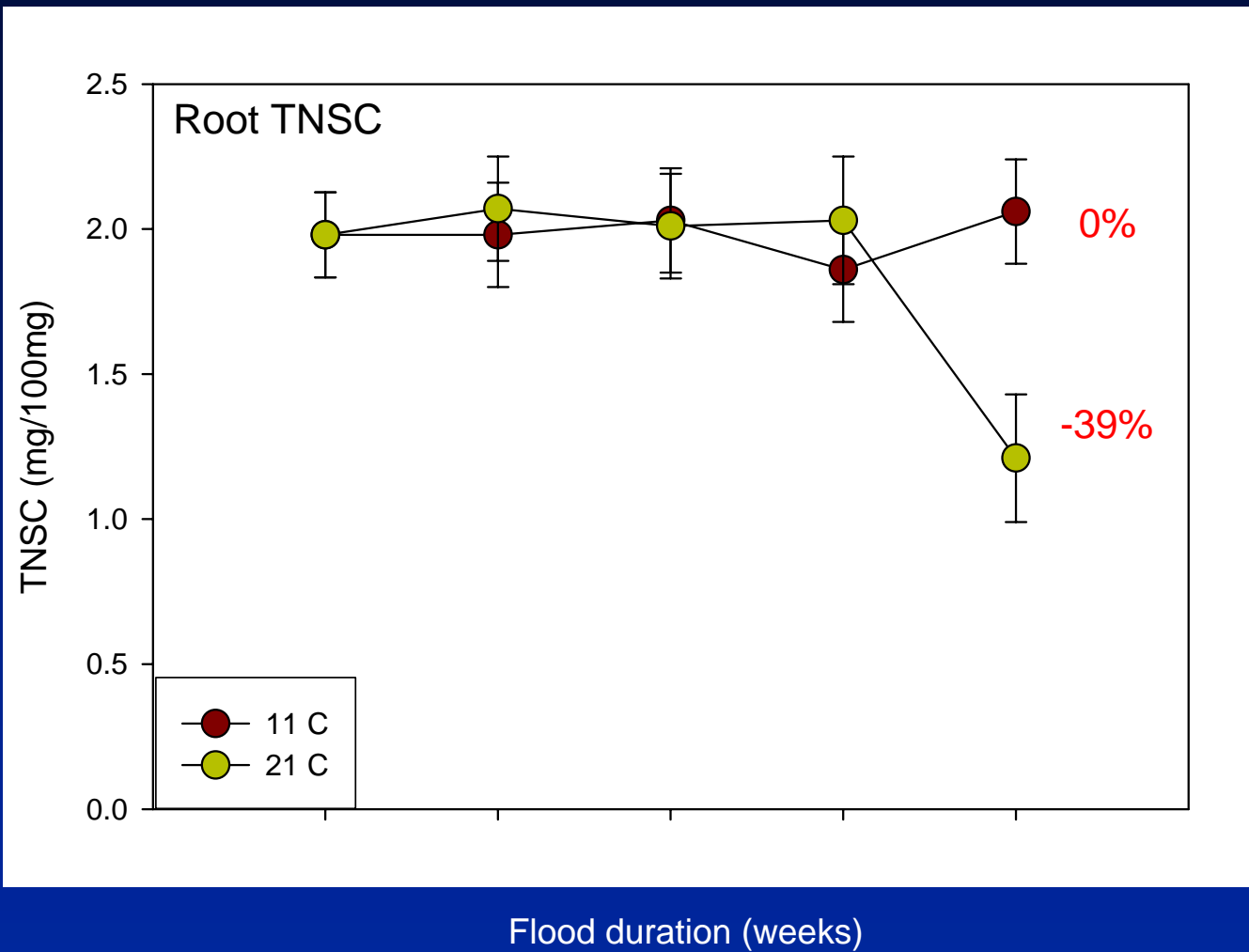


# Late Water flood





# Late Water flood



# Conclusion

- Cool LW floods had little impact on vines
- Vines subjected to warmer LW flood had had fewer CHO after the flood and even at harvest
- Vines subjected to warmer LW floods likely have reduced CHO available for spring growth

# Pesticide use BMPs

- 4 BMPs relate specifically to pesticide use in cranberry production
  - Chemigation
  - Pesticide application
  - Pesticide Mixing and Loading
  - Pesticide Storage
- Recommend reviewing these prior to the start of each season

## Specific reminders - Chemigation BMP

- Legal chemigation requires specific design elements in the irrigation system and pump – design diagrams in BMP
- Chemigation systems should be timed and tuned annually – BMP has directions for doing a dye test

# Specific reminders – Pesticide Application BMP

- Take all reasonable precautions to avoid drift during applications
- Have MSDS sheets for all products you use. Have the label and the MSDS present during applications and transport of pesticides - they may be critical if a spill or other worker exposure occurs.
- Develop an emergency plan
- Review the checklist at the end of the BMP

# Specific reminders – Pesticide Application BMP

- Calibrate application equipment annually
- Check your PPE
- Protect water resources - impound water at least as long as recommended, longer if feasible. Drop ditch levels prior to application to increase ability to impound.



